AN EXPERIMENT IN
EMPLOYING THE BLIND

Wolf, Dale

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Industrial Management

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n Experiment in Employing the Blind

How Blind Men Were Successfully Put at Work on Drilling Machines

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By Dale Wolf

Mr. Dale Wolf was trained in daily newspaper journalism and had some four years' business experience in the Middle West. For nearly three years he was Industrial Betterment Extension Secretary of the Central Y. M. C. A. of Philadelphia, specializing on employment and labor-maintenance problems. He is now Director of Employment of the Miller Lock Company.

Jig drilling of shackles for locks was selected as work that might possibly be done by blind people. After several months' trial it is found that they do the work well, but not in quite so large a quantity as workers who can see. But the experiment shows one field into which blind soldiers and other blind persons can enter and become producers and self-supporting.

DISCONTINUING the use of automatic, multiple-spindle drill presses and substituting a large number of light, single-spindle machines would hardly appear to be a wise measure. Such a venture would, on the face of it, be against efficient mechanical methods. It would also seem to be going right up against the shortage of the labor market.

In spite of appearances, out-of-the-ordinary methods were taken in the war period by almost every manufacturing firm in the country. Our unusual experience of meeting the labor shortage with blind workers on these drill presses is one that may have its after-war effect upon the handicapped blind soldiers who return from Europe.

Our plant does not manufacture its malleable iron castings, and when the war come on we were dependent upon our usual sources of supply. These were insufficient to meet the demands and, as a result, castings were turned out in almost any kind of fashion. It seemed that the fashion used for our goods was the *hard* one, for shackles came so hard that the task of drilling them became a problem in itself. To make matters worse, the quality of the drills went down so that little reliability could be placed upon the endurance of any of them. Our automatic drill presses, like others, forced the drills into the shackles regardless of their hardness or softness. In doing so a heavy strain was placed on the machine, often shutting them down for repair, and hundreds of drills were broken.

We soon found that it was costing a good deal more to drill shackles on the multiple-spindle machines than on the single-spindle ones operated by boys. Not only was the cost greater, but the purchasing department was constantly at work feeding the supply storeroom with drills for these machines.

To offset this rising cost of manufacture 12 light drill presses were purchased and installed with the view of closing down the automatic machines as soon as operators could be secured for the new ones.

The Idea of Blind Workers

One of the associates of the Employment Service Department had observed that the boys, on two old, single-spindle drill presses used for shackles, spent a great deal of time looking around the room. In spite of the fact that these boys kept their eyes on anything but their work, they were good producers and their piece-work earnings were frequently as large as any of the operatives in the department.

As a result of this observation the question was put up, If these boys can do their work well without looking at it why cannot blind women do the work on the new single-spindle drill presses? It would be a helpful experiment if it showed what would be done for blind soldiers upon their return from Europe.

With these two angles on the proposition, the experiment was submitted to the works manager. He gave his consent at once, provided the idea could be sold to three other men—the superintendent of machinery, the head of the planning department, and the foreman of the department in which the presses were located.

Patriotism was used to put the idea across to these three men. Everyone of them was as anxious to do his bit toward reconstructing the blind soldiers who might possibly return to America; and each was glad of the opportunity to contribute to such an experiment.

Recruiting the Blind Workers

Communicating with the library for the blind in the city we were told that the supply of girls could be had, if it were at all possible to arrange for their transportation. After a week the librarian phoned and asked if we could use men instead of girls, as the girls interviewed were afraid to travel alone on the streets, while men went about the city without help.

With the supply of blind female workers very doubtful, we gladly consented to give the men a chance, and were again assured that the supply would be generous.

Our first applicants came long before we were ready to operate the machines. These were from the school for the blind. But upon advice from the leading blind men of the city we decided not to employ any who came to us from this school. These handicapped men had already been trained in an occupation where they could at least make a living with the help that they secured from the home attached to the school. It was pointed out that they were not subjects of charity under their present circumstances, and would run a good chance of becoming so if they got away from the influence and direction of the home. Their livelihood and income was now fairly certain, and would be most uncertain if there was change in occupation.

Our first worker was a young fellow who had his sight until he was 14 years old. As a result of his knowledge acquired in youth we felt that he would do well in deciding the success of the venture. This man, Livingston, and another blind fellow named Tinsley (who was our second blind employee) were recruited from their own homes in the city. They had no regular occupation, although one of them caned a few chairs and the other engaged in upholstering work as occasion and customers permitted.

Starting Them To Work

Blind people talk as much about "seeing" an object as do people with sight. Several of them had been out to see the job and had been *shown* the drill presses. As a result the department had curiously anticipated the time when these fellows, who had been in to *look* at the job, would start at work.

All of the blind people when employed had been given a shackle to take home with them. This gave them an opportunity to study and get the *feel* of the object, before they really went on the job to handle it in the drilling process.

The superintendent gave his personal attention to the instruction of Livingston and Tinsley. Having such a man to work with them at the start gave the boys a good deal of confidence that they might not have secured otherwise without long practice on the job.

The jig for holding the shackle while drilling had been carefully designed for the use of the blind workers, but it was observed that Tinsley was not at first able to feed the machine properly. Frequently he would get clear outside of the jig and pull his drill down, thinking that the shackle was in the proper position.

A slight change in the jig soon corrected this wandering of the fingers. In half an hour Livingston was feeding the shackles under the drill without guidance from anyone. His next operation to be learned was that of starting and stopping the machine. This was done with proper instruction in directing the movements of his hand. By again training his hand to feel the pipe that carried the cutting compound, he was soon able to turn the coolant on and off at his pleasure. These three things he accomplished in about four hours' time. (The raising and lowering of the drill by means of the hand lever is not tabulated for time, as the blind men learned to do this on their visit to the shop to *see* the job).

The next operation taught them was the changing of drills. Livingston's record shows that it took him about an hour to learn this trick. The machines were new and the chucks did not hold well. This interfered with his progress on this operation.

By the end of the day Livingston was oiling his own machine and doing all of the other operations that were normally a part of a driller's job. In two days he had become a producing man, and it was up to him to turn out production as fast as his speed would allow.

Tinsley, the second operator, showed a little better aptitude with his fingers than did Livingston. As a result he learned the various operations faster and was producing in less than two days. Later it developed that Tinsley was a good pianist, and was accustomed to using his fingers with accuracy.

The third man to start on the work, Ashton by name, was a regular farmer with a reputation for shucking corn and planting gardens. He was a little slower than the rest, being of heavy frame and awkward in his movement. However, after two weeks' work he began to catch up with the other workers and today is rated as the best producer among our blind workers.

Sobel, the fourth beginner, was a broom maker about 25 years old. His production has been second to that of Ashton. Bloom, our fifth blind man, was a newsy on the street—the kind that is fat and jolly—and his production has been nearly the normal of that of the other workers.

The others who have gone on this work have not accomplished anything unusual. One of their number has even fallen well below his colleagues and, unless there is improvement, will have to be transferred.

Their Handicaps

Going over the production records of the blind workers with the superintendent, it is noted that this particular group of men have been handicapped by mechanical difficulties the removal of which might have increased their production to date. Such things as hard shackles (for we are still getting the same hard kind and annealing does not seem to improve them) and a poor quality of drills, such as were not put out in peace times, are still a part of the equipment that thes use. However, by being able to adjust the pressur the drills there has been a large decrease in the num broken.

Again, the machines are all new, and have required constant readjustment. The traction surface of the pulleys was found to be too small. The new belts stretched. The chucks have all been overhauled.

One day Sobel discovered that the belt on his machine was slipping. He stopped the machine, took some of the cutting compound and moistened the belt so far as he could reach. Then taking some of the metal chips that he had made, he did his best to rub them into the belt. Of course, the belt worked better and the boys thought that they had made a wonderful discovery. However, the act was soon noticed by a department head. Upon explaining to the blind workers that they should not practice such drastic punishment upon belts, they abandoned their new idea.

GROUP OF BLIND EMPLOYEES OF MILLER LOCK CO.

Today, if a belt comes off they do not ask for anyone to put it on for them. Their fingers have accomplished the trick of putting on a belt so long as the pulleys are not in motion. They are also able to walk around the machines and borrow tools from their fellow workers.

Are They a Nuisance?

After the first half day of working, we decided that the blind workers should have a man to look after their own particular needs. The selection fell to a man who was then operating a drill press and was himself handicapped, being a hunchback and crippled in his legs. We felt that with this type of man as a caretaker, he would have the proper breadth of appreciation for the affliction of the blind.

The duties of the supervisor (as he is called) are to look after the general needs of the men. He takes their drills to the tool grinding room to be sharpened, he escorts them to and from the department during working hours; goes with them to the dispensary; gets them in line to go to lunch; gets their sandwiches and hot coffee for them; calls the foreman when needed; counts the bills in their pay envolepes. In fact he is their eyes. Aside from the employment of a supervisor we have not found them to be a handicap in our plant. They come to work alone and go home alone. In entering the plant in the morning and leaving at night some one is always ready to lend them a hand. Some of them naided an hour and a half each way every day to their work.

They Are Successful Producers

We have frequently been asked the question, Are blind workers successful producers? They are successful, but so far we have not found them to be as efficient as seeing workers.

Looking over the production records of our pieceworking blind men one sees quite a variance in their output. The first day that Bloom drilled No. 016 shackles he turned out 1828 pieces; on his seventh day on this same shackle he drilled 3983, which was his top record for this in three weeks' work. The same operator drilled 1642 of our No. 131 shackle the first day he worked on them, and on the last day, some three weeks later, he drilled 7190 pieces. Bloom is an average operator.

Sobel, who is generally ranked about second in the group, drilled 2345 No. 18 shackles on his first day and gradually worked up until on his last day on this shackle (two weeks later) he produced 3376 pieces. This is an unusually hard shackle to machine.

Ashton gradually worked up from 2645 No. 700 shackles drilled on each of his first and second days to 4655 shackles on the eighth day. While Ashton shows a gradual increase in all of his work done thus far, he does not get so fine a starting record as some of his less productive fellow workers, yet his average output is the best.

After several months' trial with the blind workers, we are convinced that they have large possibilities and can produce almost up to the speed and quantity of the seeing worker. But in our line we do not believe that they can develop to the same point of proficiency as those who see.

The Government has evidently come to the same conclusion for it has arranged a series of allowances for the handicapped soldier which is aimed to make up the difference between what he can earn in industry and what he would be able to earn if he were a normal worker.

Payment of the Workers

It is an iron-clad rule in the Miller Lock Company that a piece-work price shall be the same all over the factory for the same work, regardless if it be done by man, woman, boy, girl, or cripple. When we started to place women in the jobs of men they were given the same piece-work prices and some of them have made more than the men, due to increased production.

As a result of this rule the blind workers have been given the same opportunity to increase their earnings as other employees. All of them have already gone slightly over their day-work rate, while Ashton has shown earnings quite a good deal ahead of his fellow workers.

We feel that they are only starting out and are still in the infancy of their ability. After greater proficiency is attained, their earnings should reach those of the seeing boys on the same class of work, some of whom make excellent wages.

To blind women whom we have placed in our sorting department piling cases and stringing keys, we have paid the same rates as to the seeing women in the department. These women, like the men, have not yet demonstrated that they are able to accomplish as much as the seeing workers.

The Factory View

Seeing the workers from the viewpoint of the factory one learns some lessons. When the blind man gets his pipe or cigarette lighted he is more careful regarding the burnt match than is his normal fellow worker. The normal man will throw his match, with its live coal or fire, into the nearest corner where it may start a blaze. The blind man takes a burnt match and sticks it into his pocket. No chance taking by him, for he has been severely schooled in the lesson of safety first.

Again, the blind workers are a happy and contented lot. Many of our workers have admitted that since the coming into our plant of these "sons of the dark" they have found that they have been happier in their own troubles; simply due to the fact that they have seen how happy a person could be who had a real affliction.

On the other hand, the blind workers greatly disturbed the department when they first started to work. People were very curious and anxious to see them at work. When the foreman's back was turned a group of other employees would draw close to the afflicted workers to see for themselves "if it was really true." The blind talk a great deal, using the tongue in place of eyes. This practice interferes with production. Yet, they are not running away from their machines, as other workers do when the opportunity affords.

Our blind workers frequently give concerts in the recreation room of the company during the noon hour. These are always of interest, both from the standpoint of the entertainers and the audience. Usually these brief little functions win more applause than any other form of noon-day entertainment that we have. Recently, the musically inclined of the shop gave an entertainment for sailors at the large Philadelphia Central Y. M. C. A. and the blind men occupied at least one-third of the program.

Sobel was recently offered a position as a broom maker with the possibility of making more money than as a drill-press hand. Talking it over with the writer he said: "You see if I go to making brooms again I'll have only a blind man's job. Here I have a job just like anyone else and am treated like anyone else. If they would offer me four times as much on the other job I would rather stay here."

One of the biggest gains that the workers in our plant have realized from the introduction of the blind is the change in their attitude toward such people. Our workers, normal, natural beings, have done their share of looking down with pity upon their handicapped fellows. Today they associate with the crippled and blind in a way that they have never done before. Instead of just pitying them, they associate with them just as they would with anyone else.

Ours is a plant that has tried several experiments with the handicapped individual. We have the deaf and dumb running automatic screw machines; the one-legged man; cripples in almost all stages, even those that have lost an arm. Now that peace has come every manufacturer should begin to consider how he can use the handicapped, for every type of injured and maimed will come home, each presenting its own peculiar problem which industry will be asked to solve.

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Turbine Ship Propulsion

The high-speed turbine with the floating frame reduction gear, invented by Admiral G. W. Melville and Mr. John H. Macalpine, has proved its reliability not only for use on land, but marine service as well. Between November, 1915, and September, 1918, thirty-one ships using this equipment had been put into service and of these twenty-three have had no trouble with the propulsion machinery; four experienced some trouble due to improper lubrication; two to defective material, and one to errors in assembling the apparatus.

Principles of Purchasing and Storin

Applied to Rough, Bulky Materials in Yard Storage

By Dwight T. Farnham

Six major principles are considered in planning yard storage: The effort required to transport; efficient piling determined from weight and material to be stored on each square foot of space; rate of stores turnover; storage unit; allotted space; most efficient package. Illustrations show how these are applied in storing such material as brick, castings, sewer pipe and lumber.

Mr. Dwight T. Farnham's *industrial experience covers some thirteen years in a number of plants as laborer, foreman, superintendent and manager. For the past four years he has been engaged in industrial engineering work; two years as supervising engineer for the Emerson Company, and two in private practice. He is a frequent contributor to the technical press.*

THE first job handed me when I emerged from beneath the shelter of the New Haven elms was that of receiving clerk in what had been a deserted mining village in the Alleghanies. I had hardly exchanged silk shirt and flannel trousers for flannel shirt and corduroys when I was sent out to check up some miles of pipe and pipe fittings which were arriving at the rate of about six cars a day. Inasmuch as I had always supposed that unions had only to do with matrimony or with laboring persons and that elbows were parts of the human anatomy employed principally in getting into college fraternities, the knowledge that Mr. Crane had borrowed names from heaven and earth in order to describe some thousands of oily castings which arrived in bunches and had to be segregated into kegs, gave birth to the suspicion that a diploma was by no means the guarantee of omniscience I had supposed.

For some months, while I was receiving and storing about a hundred thousand dollars worth of materials, machinery and supplies, which ran the gamut from two-hundred-foot stacks which arrived in sections to deep-well pumps which required placement at the bottom of four-hundred-foot drill holes, I read trade catalogs evenings and daytimes taught "Yo heave" songs to what, in those days, we disrespectfully referred to as "wops." Ever since then the physical problems connected with storage have peculiarly appealed to me for analysis.

Scientific storage is largely a matter of predetermining conditions and of routing. To make clear exactly what is meant, suppose we dodge Rankin's terms and all symbols involving consideration of velocity and resistance and invent a very unscientific unit of work which we will call the *horizontal foot-pound*—allowing the term to describe the effort, human or otherwise, required to transport, by any constant means, one pound of goods one foot. In planning a storage yard or storeroom, the prime requisite, if unnecessary effort in the transportation of goods is to be considered, is to arrange a layout which in actual operation will require the minimum of expenditure of "h.f.p." year in and year out.

This requires first *a determination of the weight of each material which can be stored on each square foot of space, when piled to the height which is most efficient, taking into consideration the means of stacking, mechanical or otherwise,* which are *available.*

It is obvious that it would not be economical to store 50 tons of empty barrels piled six feet high for the first 500 feet about a railway loading and unloading platform thereby forcing the same weight of pig lead to be stored 600 feet away from the point of arrival and departure when the demand by weight for each was the same. Such an arrangement would involve the transportation of a heavy weight 500 feet every time *any* lead was required, while if the lead were stored close to the platform the entire 50 tons would, if also piled six feet high, occupy a few square feet only, making it unnecessary to go more than 10 or 15 feet when barrels were required. The rule then, other things being equal, should be to concentrate the goods of which the greatest weight can be stored in a unit of space the closest to the points of arrival and departure, as in this way the fewest pounds will be transported the fewest feet.

RATE OF STORES TURNOVER

The second requisite for scientific storage is *a determination of the rate of turnover* of each material. This is a principle which is known to every country storekeeper who keeps his cigars and candy near the front door and his Christmas goods and crockery in the attic in order to save himself steps. In the case of the candy the turnover is about 10 or 12 while crockery stock is not turned over once a year. On the same principle, if our 50 tons of pig lead was required only once in 10 years, while the 50 tons of barrels were all removed from storage once a day, it would be more economical to pile the lead somewhere out in the Bronx of the storage yard, while the barrels were stored at its Broadway and Forty-second Street intersection.

The enumeration of these two principles brings us to the practical method of application. This is perhaps best illustrated by an arrangement of a yard which covered about five acres upon which was stored something over $300,000 worth of miscellaneous products. These were first listed according to the weight which could most economically be stored on a certain number of square feet of ground. They were then listed according to the previous years' sales in tons and from these two lists was worked out the priority of right of each to storage space nearest to the points of manufacture and departure, which were close together. The final arrangement follows, the priority of place for each being indicated in the right hand column:

It is, of course, obvious that the final arrangement is worked out only on an approximate *horizontal foot-pound* basis. In this particular case it was necessary to take various other factors into consideration, a discussion of which would entail the presentation of a mass of detail out of place in an article of this nature.

Just how far an industrial engineer or a manufacturer is justified in working to the final detail, in applying this principle—or any principle—depends upon circumstances and the press of other more important work. To my mind the safe rule is to apply the principle in just as great detail as will earn a profit on the cost of doing the work, providing a greater profit cannot be earned on some other work for the same time and money.

DETERMINATION OF STORAGE UNITS

The next step in planning the layout of a storage yard —or of a store-room—is the determination of storage

poor quality of drills, such as were not put out in peace always ready to lend them a hand. Some of them

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